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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,301	03/10/2004	Jun Hamakita	K06-167785M/TBS	9114

21254 7590 03/19/2007

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EXAMINER	
SCHARICH, MARC A	
ART UNIT	PAPER NUMBER
3611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/19/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/796,301	HAMAKITA ET AL.	
	Examiner	Art Unit	
	Marc A. Scharich	3611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1/19/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,10-12 and 14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5, 10-12, and 14* is/are rejected.

7)☒ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The present application has been transferred to a new examiner (Marc A. Scharich), and after consideration of the After-Final amendment received on 1/19/2007 new issues and grounds of rejection have been established by the examiner, thus the present application is REOPENED and this office action is deemed NON-FINAL.

Claim Objections

1. Claim 10 is objected to because of the following informalities: line 6 contains the phrase "a rotary shaft", which should be amended to -- ~~a~~ the rotary shaft -- since "a rotary shaft" is already introduced in claim 1. *Appropriate correction is required.*

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 10, 12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eda et al., U.S. Patent No. 5,482,127, in view of Lewis, U.S. Patent No. 3,234,758. Eda et al. discloses an electric power steering device (100) (*shown overall in FIG. 1 and more detailed in FIG. 2*) for transmitting a rotation of an electric motor (102) for assisting operation of steering which is reduced via a speed reduction mechanism [*reduction worm gear (103a) and worm wheel (104)*] to a steering

mechanism (not shown). The electric power steering device (100) further contains a joint comprising a first transmission shaft (130) that contains a male spline portion (130b); a cylindrical portion (131b) that contains a female spline portion (131c) that mutually engages with the male spline portion (130b) and appears to be completely devoid of an O-ring; and the joint ultimately being connected to a rotary shaft (not shown) of electric motor (102) for transmitting the rotation of the motor (102) to the speed reduction mechanism [*reduction worm gear (103a) and worm wheel (104)*].

Eda et al. *fails to disclose or suggest* a motivation for: charging grease in a gap between the male splined portion of the first transmission shaft and the female splined portion on the cylindrical body; the grease including a base oil having a kinetic viscosity of 1000 to 5000 mm^2/s (40°C), and a worked penetration of the grease being not more than 300; *or* the kinetic viscosity of the base oil being not more than 2500 mm^2/s; *or* the kinetic viscosity of the base oil being not less than 1500 mm^2/s; *or* the worked penetration of the grease being not more than 260; *or* the worked penetration of the grease being not less than 200. It has been well-known in the art for many years, *however*, that various compositions of lubricants may be included ("charged") between male and female spline engagements that rotate and endure load (torque). For instance, Lewis discloses a drive shaft slip spline assembly which includes a rotating driving means (12) with axial male splines (17) that engage axial female splines on an inner circumferential periphery (16) of a cylindrical end piece (14) that is connected to a vehicle drive shaft (10). Further, Lewis discloses that lubricants, such as grease or oil, may be employed between male and female spline portions (i.e. col. 2, lines 27-29). It

is also known, and as Lewis discloses, that higher viscosity lubricants, such as heavy oils and greases, have customarily been employed to lubricate highly loaded contacting surfaces (col. 1, lines 28-30) (such as between the male and female splines of the disclosed invention of Lewis) for obvious reasons such as helping to relieve friction in high loaded [torque] conditions to prevent wear and friction in jointed assemblies with slip splines. Although Lewis does not specifically disclose or mention specific greases with kinematic viscosities or worked penetrations within the claimed values of the present application, it is well-known that such greases that are on the market may be *optimally selected* (i.e. based on testing) in such a manner as to be optimal for the particular application. Basically, kinematic viscosities or worked penetrations are merely tested physical properties (i.e. per ASTM –D445 standards) of lubricants, NOT part of an actual chemical composition, and it is well-known to select optimal greases with appropriate physical properties to optimize a function on a particular mechanical application (such as providing a desired effect between male and female splines). Therefore, considering the teachings of Lewis (utilization of grease between male and female spline joints) and the well-known fact that greases available on the market with certain known physical properties may optimize a particular mechanical application, it would have been *blatantly obvious* to one having ordinary skill in the art at the time of the invention to include or "charge" grease in a gap between the male splined portion of the first transmision shaft and the female splined portion on the cylindrical body on Eda et al.'s invention (*for the benefits as discussed above*) with an available grease on the market that demonstrates such known physical properties of kinematic viscosity and

worked penetration in the ranges as claimed by the present application in order to reduce wear or friction in the rotating spline joint.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Eda et al., U.S. Patent No. 5,482,127, in view of Lewis, U.S. Patent No. 3,234,758, and in further view of Kobayashi et al., U.S. Patent No. 6,900,564. In combination, Eda et al. and Lewis fail to disclose a worm wheel comprising a synthetic resin, such as polyacetal, terephthalate, or polybutylene terephthalate. Kobayashi et al discloses an electric power steering system, very similar in nature to that of Eda et al., with a worm wheel (19), having teeth formed of a polyacetal resin (POM). It is very well known and *blatently obvious* that such gears or worm wheels may be manufactured from many materials (such as metals or polymers) depending on the particular application. Therefore, based on the teachings of Kobayashi et al., it would have been obvious to one having ordinary skill in the art at the time of the invention to manufacture the worm wheel (or part of the worm wheel) in Eda et al.'s invention, and in combination with the teachings of Lewis, out of a polyacetal resin (POM) for optimal performance depending on the operating conditions of the particular application in which the worm wheel is utilized.

Response to Arguments

3. Applicant's arguments (received 1/19/2007) with respect to claims 1-5, 10-12, and 14 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marc A. Scharich whose telephone number is (571) 272-3244. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

Conclusion

4. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lesley Morris can be reached on (571) 272-6651. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

M.A.S. – 3/7/2007

LESLEY D. MORRIS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3600

Marc A. Scharich
Patent Examiner
Art Unit 3611